What is claimed is:

1. An apparatus for inspecting contours formed along a predetermined region of a surface on a workpiece formed of electrically conductive material using eddy current comprising:

a probe having a longitudinal axis, the probe movable along a path of travel with respect to the predetermined region to be inspected on the workpiece to a static testing position substantially coaxial with the longitudinal axis of the probe;

at least two coils spaced longitudinally from one another and supported by the probe to be electrically excited with a predetermined frequency and amplitude while the probe is stationary at the static testing position with respect to the workpiece; and

means for measuring the excitation voltage of each coil as eddy currents are induced in the electrically conductive material of the workpiece by the coils supported on the probe while stationary with respect to the workpiece.

2. The apparatus of claim 1 wherein the at least two coils further comprises:

first and second coils disposed coaxial with respect to one another.

3. The apparatus of claim 2 wherein the measuring means further comprises:

a first voltage sensor for measuring the excitation voltage of the first coil;

a second voltage sensor for measuring the excitation voltage of the second coil; and

a comparator for subtracting the excitation voltage sensed by the second voltage sensor from the excitation voltage sensed by the first voltage sensor.

4. The apparatus of claim 1 wherein the probe is moveable to the static testing position within an aperture of the workpiece.

5. The apparatus of claim 1 wherein the probe is moveable to the static testing position to sheath a shaft of the workpiece.

6. The apparatus of claim 1 wherein the measuring means further comprises:

a first voltage sensor for measuring the excitation voltage of one of the at least two coils;

a second voltage sensor for measuring the excitation voltage of the other of the at least two coils; and

a comparator for comparing the excitation voltage sensed by the second voltage sensor to the excitation voltage sensed by the first voltage sensor.

7. The apparatus of claim 1 further comprising:

a central control unit, responsive to the measuring means, for determining if the workpiece being tested conforms to predetermined specifications.

8. The apparatus of claim 1 further comprising:

a linear variable differential transformer for measuring a position of the probe as the probe is being moved along the path of travel to the static testing position with respect to the workpiece.

9. The apparatus of claim 1 further comprising:

a linear potentiometer for measuring a position of the probe as the probe is being moved along the path of travel to the static testing position with respect to the workpiece.

10. The apparatus of claim 1 further comprising:

means for comparing measured eddy current signals from the at least two coils, where non-zero differences after the coils are positioned stationary at the static testing position represent an end position of the predetermined region formed on the workpiece being tested.

11. A method for inspecting contours formed along a predetermined region of a surface on a workpiece formed of electrically conductive material using eddy current comprising the steps of:

moving a probe having a longitudinal axis along a path of travel to a static testing position substantially coaxial with the longitudinal axis of the probe with respect to the predetermined region to be inspected on the workpiece;

electrically exciting at least two coils spaced longitudinally from one another and supported by the probe with a predetermined frequency and amplitude while stationary at the static testing position; and

measuring the excitation voltage of each coil as eddy currents are induced in the electrically conductive material of the workpiece by the coils supported on the probe while stationary with respect to the workpiece.

12. The method of claim 11 wherein the at least two coils includes first and second coils disposed coaxial with respect to one another.

13. The method of claim 12 wherein the measuring step further comprises the steps of:

measuring the excitation voltage of the first coil with a first voltage sensor;

measuring the excitation voltage of the second coil with a second voltage sensor; and

subtracting the excitation voltage sensed by the second voltage sensor from the excitation voltage sensed by the first voltage sensor with a comparator.

14. The method of claim 11 wherein the moving step moves probe to the static testing position within an aperture of the workpiece.

15. The method of claim 11 wherein the moving step moves probe to the static testing position to sheath a shaft of the workpiece.

16. The method of claim 11 wherein the measuring step further comprises the steps of:

measuring the excitation voltage of one of the at least two coils with a first voltage sensor;

measuring the excitation voltage of the other of the at least two coils with a second voltage sensor; and

comparing the excitation voltage sensed by the second voltage sensor to the excitation voltage sensed by the first voltage sensor with a comparator.

17. The method of claim 11 further comprising the steps of:

determining if the workpiece being tested conforms to predetermined specifications with a central control unit, responsive to the measuring step.

18. The method of claim 11 further comprising the step of:

measuring a position of the probe as the probe is being moved along the path of travel with respect to the workpiece to the static testing position with a linear variable differential transformer.

19. The method of claim 11 further comprising the step of:

measuring a position of the probe as the probe is being moved along the path of travel with respect to the workpiece to the static testing position with a linear potentiometer.

20. The method of claim 11 further comprising the step of:

comparing measured eddy current signals from the at least two coils, where non-zero differences after the coils are stationary at the static testing position represent an end position of the predetermined region formed on the workpiece being tested.

21. An apparatus for inspecting contours formed along a predetermined region of a surface on a workpiece formed of electrically conductive material using eddy current comprising:

a probe having a longitudinal axis, the probe movable along a path of travel to a static testing position stationary with respect to the predetermined region to be inspected on the workpiece, the predetermined region including at least one thread;

at least two coils spaced longitudinally from one another and supported by the probe to be electrically excited with a predetermined frequency an amplitude while stationary at the static testing position; and

means for measuring the excitation voltage of each coil as eddy currents are induced in the electrically conducted material of the workpiece by the coil supported on the probe while stationary with respect to the workpiece.

22. The apparatus of claim 21 wherein at least two coils further comprise:

first and second coils disposed coaxial and longitudinally spaced with respect to one another.

23. The apparatus of claim 22 wherein the measuring means further comprises:

a first voltage sensor for measuring the excitation voltage of the first coil;

a second voltage sensor for measuring the excitation voltage of the second coil; and

a comparator for subtracting the excitation voltage sensed by the second voltage sensor from the excitation voltage sensed by the first voltage sensor.

24. The apparatus of claim 21 further comprising:

means for comparing measured eddy current signals from the at least two coils, where non-zero differences after the coils are stationary at the static testing

position represent an end position of the predetermined region formed on the workpiece being tested.

25. An apparatus for inspecting contours formed along a predetermined region of a surface on a workpiece formed of electrically conductive material using eddy current comprising:

a probe having a longitudinal axis, the probe movable along a path of travel to a static testing position stationary with respect to the predetermined region to be inspected on the workpiece, the predetermined region to be inspected remaining substantially stationary with respect to the stationary static testing position of the probe during testing;

at least two coils spaced longitudinally from one another and supported by the probe to be electrically excited with a predetermined frequency and amplitude while stationary at the static testing position; and

means for measuring the excitation voltage of each coil as eddy currents are induced in the electrically conducted material of the workpiece by the coils supported on the probe while stationary with respect to the workpiece.

26. The apparatus of claim 25 wherein at least two coils further comprise:

first and second coils disposed coaxial and longitudinally spaced with respect to one another.

27. The apparatus of claim 25 wherein the measuring means further comprises:

a first voltage sensor for measuring the excitation voltage of the first coil;

a second voltage sensor for measuring the excitation voltage of the second coil; and

a comparator for subtracting the excitation voltage sensed by the second voltage sensor from the excitation voltage sensed by the first voltage sensor.

28. The apparatus of claim 25 further comprising:

means for comparing measured eddy current signals from the at least two coils, where non-zero differences after the coils encounter the predetermined region to be tested represent an end position of the predetermined region formed on the workpiece being tested.